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AN EXPERIMENTAL INVESTIGATION OF LEARNING
AND PERFORMANCE IN CHILDREN WITH
ACADEMIC DISABILITIES

by

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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy
in the Department of Psychology in the Graduate
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ABSTRACT

(Psychology-Child)

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ABSTRACT

A distinction between learning and performance has long been traditional in theoretical and experimental formulations of general learning theory. More recently a similar or parallel distinction has developed in the literature on children with academic difficulties. Here it has been referred to as a distinction between "assimilation and utilization" or between "disorders in the function of taking in knowledge" and "disorders in the use of learning." Other recent investigations have further hypothesized that a set of broad motivational variables characterized as "fear of success" or "need to fail" are crucial in the poor achievement of some children with academic difficulties. This study was designed as an experimental investigation of some consequences that seemed deducible from the inter-relationships among these distinctions and hypotheses.

Three groups of children were defined within a normal school population by a statistical comparison of academic grades and achievement test scores in reading. All subjects had at least average I.Q. scores. In the first group, academic grades were significantly lower than might have been predicted from the achievement test scores. This was considered to reflect a difficulty in performance and the group was referred to as the non-performers. In the second group, academic grades and achievement test scores were both considerably below the average for the whole group. This was considered to reflect a difficulty in learning, and the group was referred to

as the non-learners. In the third group, academic grades and achievement test scores were congruent and both were at an average level. This group was referred to as the normals.

Subjects were examined individually under one of three conditions of evaluative feedback: (1) competitive success, (2) competitive failure, and (3) neutral. In the competitive success condition, the subject was convinced that he was performing more adequately than his peers. In the competitive failure condition, he was convinced that he was performing more poorly. In the neutral condition, the feedback was purely procedural.

A modified version of the Digit-Symbol Test was the principal task. During the performance trials emphasis was on speed, and time in seconds was taken as a performance measure. After 10 trials, each subject was asked to complete the Digit-Symbol form without a key. The number of digit-symbol combinations remembered correctly was taken as a measure of learning. Thematic Apperception Test stories and Sarason Anxiety Scale scores were obtained from each subject.

The major hypotheses may be stated informally. The non-performer group should show greater decrement in performance than in learning, and the largest performance decrement should occur under the competitive success condition.

The non-learner group should show decrements in both performance and learning when compared to the other two groups. They should show no special decrement under success.

The normal group should show best performance and learning under the success condition with only slight decrements under the other two conditions.

There should be no difference between the non-performer and the normal group on the learning measure.

None of these major hypotheses were unequivocally substantiated. There was, however, evidence to warrant several conclusions.

The groups defined statistically were discriminable on some experimental tasks. This lends credence to the notion of two types of learning problems.

The crucial role of competitive success in influencing the behavior of the non-performer group was demonstrated. However, such broad motivational patterns as "need to fail" or "renunciation of success" are not sufficiently explanatory. There was, in fact, evidence that consideration must also be given to the non-performers unduly intense "need to succeed".

The experimental conditions were effectively created in that there were differences among conditions across all groups on the learning measure. Also, each group showed a pattern of differential response to each of the conditions.

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L. E. U.

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AN EXPERIMENTAL INVESTIGATION OF LEARNING
AND PERFORMANCE IN CHILDREN WITH
ACADEMIC DISABILITIES

Chapter I
INTRODUCTION
and
STATEMENT OF THE PROBLEM

In the literature of psychology, psychiatry, and education, terms such as "learning problem," "learning difficulty," "learning block," "learning inhibition," "learning disorder," or "learning impotence" are used more or less synonymously to refer to a wide variety of phenomena of varying degrees of specificity. In their most general usage, however, they all refer to a child or group of children whose achievement in school is inadequate by some standard. That is, the "learning" used in these phrases usually refers to academic achievement.

One use of these terms refers to children whose basic capacities for learning are in some way inadequate or impaired. Rabinovitch (1959, ch. 43) provides an excellent discussion of this problem area and considers such factors as general intelligence, vision, neurological intactness, language capacity, developmental readiness, and motivation. For this group of children, the criteria to which their achievement is compared are some form of age or group statistical standards or norms.

In another quite heterogeneous group the child's basic learning skills and capacities are adequate and intact, and the learning difficulty arises as only one symptom or manifestation or a more general, pervasive or

obvious disturbance. These disturbances may be biological, sociological, or psychological. For example, a child who suffers from a serious chronic illness may have poor academic achievement as one of many secondary manifestations of the debilitating effects of the physical illness. Or, the child of a transient family may do poorly in school because of the general social disorganization that he experiences. Or, poor school achievement may be a secondary symptom of a more general emotional disturbance: for example, the hyperactive, aggressive child whose attention span and ability to concentrate are seriously impaired. Pearson (1954, ch. I) discusses such secondary involvements under the rubric, "When the Learning Process is Not Involved in the Neurotic Conflict." In this group, the learning difficulty is only one of many clearly manifested symptoms of a general functional disturbance.

A small, but important, group of learning difficulties is generally referred to as "specific learning difficulty." That is, the poor achievement is highly circumscribed. It may be only with one kind of academic material, or in a particular situation, or with a certain teacher, etc. These difficulties can usually be traced to a particular trauma, interpersonal situation, or symbolic expression of a highly focused conflict. For example, a child might have difficulty with spelling because of having been punished for writing dirty words; a particular teacher may especially arouse unconscious conflicts; or a child may not be able to learn fractions because he cannot tolerate the concept of things that are cut up. In this group, the child's poor performance is contrasted with his more adequate achievement in other areas.

In yet another group, of primary concern for this investigation, the learning difficulty is a serious and pervasive one. That is to say, the children in this group perform poorly on most or all of their academic work.

There is, however, no other outstanding symptomatology. There may be minor associated symptoms, such as nail biting or enuresis; but poor school performance is the dominant concern. Most importantly, there is no impairment of basic learning skills or capacities. This is usually demonstrated by the fact that these children do well on I.Q. tests. This combination of generally poor academic work associated with adequate or superior performance on intelligence testing is the most salient and puzzling characteristic of this group.

Within this group, however, a further differentiation can be made. In the terms that have been used by Rabinovitch, it is a distinction between ". . . assimilation and utilization in academic learning" He attributes both difficulties to "Anxiety That Interferes with Concentration." However, in "utilization" difficulties, he feels that, ". . . while grades are poor when such interference occurs, basic skills are not necessarily affected. In such cases, both techniques and facts are learned but are not applied in a meaningful way." In cases of "assimilation" difficulty ". . . anxiety affects assimilation of basic skill materials" (1959, p. 861).

Pearson makes a similar distinction when he discusses "Diminished Capacity to Learn Due to Disorders of the Use of Learning" and "Diminished Capacity to Learn Due to Disorder in the Function of Taking in Knowledge." Of the former he says, "Here the ability to take in knowledge, to digest the knowledge, and to give it out all function perfectly. The difficulty lies in the inhibition of the use of the learning. In this the disorder very closely resembles sexual impotence, and therefore I would like to designate it as 'learning impotence.'" (1954, p. 44) Of the second he writes, "Ungratified excessive oral needs in infancy, and the fear of the results of oral gratification, often will affect the future learning ability

of the child. One result of such a conflict may be a simple inhibition in the taking in of knowledge" (1954, p. 67).

This kind of functional discrepancy has long been recognized as a clinical phenomenon. However, little or nothing has been done to investigate it directly. It can be seen, however, that it closely parallels the distinction between learning and performance that has long been made in the experimental learning literature.

"One of the most basic distinctions in the field of learning is that between learning and performance. In this distinction, the discrimination is between the underlying process theoretically produced by reinforced practice (that is, learning) and the manifestations of the underlying process (that is, performance)." (Kimble and Garmezy, 1963, p. 177). Thus, one set of variables may determine or influence learning and quite a different set of variables may determine or influence the behavioral expression of what has been learned.

The technical difficulties involved in attempting to differentiate experimentally the variables influencing learning and those influencing performance are succinctly discussed by Kimble in Hilgard and Marquis' Conditioning and Learning (1961, p. 117). However, despite these difficulties, the long tradition of experimental studies of learning has given rise to a generally accepted listing of variables most influential in each condition.

These have been summarized by Kimble and Garmezy as follows:

Variables Determining the Degree of Learning

- The amount of practice
- The amount of reward
- The delay of reward
- Interstimulus interval
- Partial reinforcement

Variables Affecting Performance

Motivation

Work and distribution of practice (1963, pp. 147-157)

These variables are, of course, extremely difficult to specify with human subjects even in simple experimental situations; and in the complex situation of academic learning and performance this difficulty becomes almost insuperable. However, the learning-performance distinction does seem to provide a unifying concept between the "assimilation" and "utilization" distinction of Rabinovitch and the "learning impotence" and "inhibition in the taking in of knowledge" of Pearson.

In academic "learning problems" then, one must consider internal motivational states of considerable complexity and their selective activation by varying conditions at the time of performance. Or, where the learning process itself has been interfered with, equally complex variables may determine the amount of learning.

One line of inquiry that has made some effort to consider the problem of the nature of these complex human motivational states has been the case study investigations into the dynamics and motivational patterns of school failure. These studies have not systematically taken into account this distinction between two types of learning problems, but they do provide valuable insights into the relevance of certain variables for the general area of learning problems.

All the case study findings and the formulations based on psychoanalytic theory emphasize a general attitude or motivational state that is variously labeled "fear of success," "renunciation of success," or a "need to fail." Though not in relation to learning problems, Freud discussed this general problem in his 1915 paper, "Some Character-types Met with in Psycho-

analytic Work," under the heading "Those Wrecked by Success." Here he was concerned with those people who fall ill only after attaining a long cherished wish or ambition. ". . . it is not so very unusual for the ego to tolerate a wish as harmless so long as this exists in phantasy alone and seems remote from fulfilment, while it will defend itself hotly against such a wish as soon as it approaches fulfilment and threatens to become actuality." (S. Freud, 1950, pp. 325-6). He concludes: "Psycho-analytic work teaches that the forces of conscience which induce illness on attainment of success, as in other cases on a frustration, are closely connected with the Oedipus-complex, the relation to father and mother, as perhaps, indeed, is all our sense of guilt in general." (S. Freud, 1950, p. 341).

A variety of writers have discussed learning within the framework of psychoanalytic theory and have attempted to relate its disorders to vicissitudes of libidinal development and to fixations or regressions in the psychosexual process. (A. Freud, 1954), (Klein, 1949), (Liss, 1935, 1937, 1940, 1941, 1944, 1949, 1955), (Mahler, 1942, 1950). The findings and conclusions of these writers are both too general and too detailed to be appropriately summarized.

However, starting in the late 1950's there has come from the Judge Baker Foundation a series of papers based on the study of "broad motivational patterns" of boys who are unable to succeed in school and their families. In the most pivotal article of this series, Sperry et al. use the telling phrase "renunciation of success" or "renunciation of the right to succeed" to characterize their central concept. They found that boys with serious learning problems are in general ". . . children in whom guilt and anxiety about competitive and acquisitive impulses led to such renunciation of the right to succeed." (1958, p. 98). The guilt and anxiety aroused by success or by

the efforts necessary for success were thought to have their origin in the nature of the solution to the Oedipal problem adopted by these boys.

Oedipal material was present in the fantasies of all the boys. The element of this situation that appears to have created the most difficulty is the phallic aggression connected with strivings for sexual identity. Neither in projective tests nor in the interview material did the boys appear to be dealing with a quantity of aggression which they feared they would be unable to control. Not the fear of being overwhelmed by impulses, but the fear of loss of love, either through parental withdrawal or the loss of love objects, was the primary concern. The oedipal situation appears to have been dealt with by a partial masochistic surrender in the interest of securing dependent love. (Sperry et al., 1958, p. 107).

Grunebaum et al. studied certain aspects of family relations of boys with learning problems and found that these families ". . . tend to confuse aggression as it refers to hostile, hurting impulses with the aggressive activity that goes into learning, achievement and success. The confusion leads to the unconscious equation that 'to achieve is to hurt.'" (1962, p. 466) Therefore, apparently, achievement or success must be renounced.

The same general finding is stressed in a paper based on case studies of five boys by Talbot and Henson. These boys all suffered from learning inhibitions and, "The social findings revealed that each boy was protecting himself against an anticipated impending disaster by the defensive mechanism of ceasing to learn." (1954, p. 389).

Finally, a case study by Wallach, Ulrich and Grunebaum of a boy named Bobby concludes: "No matter how genuine his distress about failure, it was evident that Bobby possessed a clearly defined need to fail." (1960, p. 356).

It should, perhaps, be made explicit that none of these boys consciously wants or intends to fail. From the child's point of view, it is something inevitable that happens to him. There can be no doubt that they are seriously distressed by their failures. Grunebaum et al. reports that the boys in their study consciously feel themselves to be ". . . inadequate

and incompetent in school. The range of self-defeating attitudes varies from views of the self as unable to achieve to a perception of schoolwork as useless." (1962, p. 468) She further states that "Characteristically, the majority of our boys alternate between chronic fears of failure and of success, investing an enormous amount of effort in maintaining their schoolwork in a marginal status." (1962, p. 471).

Thus, it seems clear that success and failure, perhaps particularly success and failure in a competitive situation, are crucial variables in the behavior of children with learning problems.

Statement of Problem

The general purpose of this investigation is to bring together these two general lines of thought in a simple experimental situation. It will attempt to delineate two groups of children with learning problems -- one group that has particular difficulty with performance and another that has particular difficulty with learning -- and study their learning and performance under conditions of competitive success and failure. A normal group and a neutral condition will be added in order to make comparisons. Each child will be asked to perform in a situation where he cannot evaluate the adequacy of his performance but where evaluative comments indicating competitive success or failure can be supplied by the examiner. Thus, there will be performance trials with evaluative emphasis placed on a performance measure -- speed. Subsequently, each child will be asked to demonstrate how much he has learned during these performance trials. The learning in this design is of the kind that has sometimes been characterized as "incidental."

For the sake of brevity, the normal group will be referred to as normals or No. The group with primary difficulty in the area of performance will be referred to as non-performer or NP; and the group with primary difficulty in the area of learning will be referred to as non-learner or NL. Each of the groups may be informally characterized as follows:

Normals Academically and on formal achievement tests the level of performance is generally congruent with intellectual level. Though perhaps not always achieving up to their level of aspiration, their academic efforts are primarily successful. This success is a positive experience for them and does not arouse undue anxiety, guilt, or conflict. They have passed the major developmental milestones. They have achieved a firm individual and sexual identity; have resolved the infantile ambivalence toward their parents; and they are free to use their assets in the pursuit of their goals.

Non-performers This group's performance is generally uneven, variable, or "spotty." They are sometimes quite successful, while at other times their performance is unexpectedly poor. On the one hand, they avoid outright or complete failure. On the other hand, they can never fully utilize their assets to be really successful. In the area of identity, these children have a clear sense of individuality but are not completely comfortable in the masculine role. "These boys vacillate between an active and a passive role but are comfortable in neither. They are by no means resigned to feminine identification." (Sperry, Ulrich, and Staver, 1958, p. 642). Within the family, these children are most characteristically involved in some unresolved conflict with their fathers. Further, "The problem of their relationships with men or other boys rather than with women came up early in the therapeutic interview with all these boys, regardless of the sex of the therapist. They

appeared to be trying to orient themselves to their own role with regard to their fathers." (Sperry et al., 1958, p. 106). These children in general fear competition and the prospect of success arouses anxiety. In general it seems likely to suppose that these children will improve their performance in the face of failure and will perform more poorly when success seems imminent. Regardless of the level of their actual performance, they may be all the while learning the material with which they have been concerned.

Non-learners This group's academic performance is uniformly and consistently poor. They have the capacity to learn, and they apparently do learn and profit from their routine daily experiences. Within the academic setting, however, they almost always fail; and in testing situations they have had little experience with feelings of success or accomplishment. When anything is demanded of them academically, they automatically expect to fail. They quickly become discouraged and give up easily. Clinically, these children have not achieved a clear sense of individuality. They are not so much concerned with sexual identity as they are with their identity as separate individuals. Staver says, ". . . mother and child cling to each other with an attachment which leaves them unclearly differentiated as separate persons, with the child representing to the mother a part of herself that cannot be valued, but that cannot be lost." (1953, p. 134). Rubenstein, et al. describe their group of children as ". . . fixed in the symbiotic relationship with the mother . . ." but at the same time as struggling with it. "Never achieving individuality, they lack the more highly developed techniques for the separation of self from the outer world." (1959, p. 319). Obviously, within the family their major conflict is with their mothers. Since these children have had little or no experience with successful, independent activity, it seems most likely that at the first hint of failure they will give

up any real effort and fail to improve their performance. In situations where they experience success, they may be able to improve their performance to some degree. Compared with the other two groups, however, the degree of actual learning will be minimal under both conditions.

To some extent these descriptions represent the extremes, and might not be applicable to any specific child in this sample drawn from a population in which all the children are functioning with some degree of effectiveness at their appropriate grade level in public school.

Criteria for the Groups. Each of these groups may be operationally defined in terms of the relationships between I.Q. scores, achievement test scores, and school grades.

Normals

Normal I.Q.
Average Achievement Test Score
Average Academic Achievement

Non-performers

Normal I.Q.
Average Achievement Test Score
Below Average Academic Achievement

Non-learners

Normal I.Q.
Below Average Achievement Test Score
Below Average Academic Achievement

In a variety of studies by Sarason and his associates (1960), scores on their Test Anxiety Scale for Children (TASC) and their General Anxiety Scale for Children (GASC) have been shown to be related to a wide variety of behaviors including performance on intelligence and achievement tests. In these studies the anxiety scores are usually used as criterion measures or as independent variables. In this study each child will be given the TASC and the GASC after the experimental procedures. As dependent variables, the

the anxiety scores should show differential effects of the experimental conditions in the groups; and their relations to the performance and learning measures may be examined.

Some tentative and very general hypotheses may be stated:

Hypotheses Concerning Performance and Evaluation Conditions. In the neutral condition where no evaluative comments are supplied and the adequacy of performance is left ambiguous, the internal hypotheses and expectations of the subjects concerning their performance would be of special importance. It would be expected that normals would improve their performance over trials. Non-learners, with their past history of failure would probably quickly come to the conclusion that they are failing in this situation, and their performance would show a decrement. Non-performers would be caught in their conflicting fears and expectations of success and failure. Their performance should show considerable variability with little or no consistent improvement. Thus, normals should perform well under this condition -- significantly better than either the non-learner or the non-performer.

In the condition where evaluative statements indicating competitive success are given by the examiner, normals would be expected to improve their performance over trials. Non-learners should take encouragement from their apparent success and also improve their performance, though probably not to the same degree as normals. For the non-performers, however, this would be a most disturbing situation for the "threat of success" would arouse their anxiety and their previously hypothesized "need to fail," or "renunciation of the right to succeed." Thus, their performance should show a significant decrement under this condition.

In the condition where evaluative statements indicating competitive failure are given by the examiner, normals would still be expected to improve their performance to some extent. For the non-learners, failure is all too familiar, and they might be expected to give up and show a marked performance decrement. For the non-performers, the danger of success is removed but the fear of failure is now most salient. Thus, these children might be expected to show some improvement in their performance in this condition. Thus, normals and non-performers might do reasonably well under this condition, but non-learners should show significantly poor performance.

The same general hypotheses may also be stated in terms of the three groups: -- normals, non-performers, and non-learners.

Normals would be expected to improve their performance under all three conditions, though perhaps to a lesser degree under failure than under the other two.

Non-performers would be expected to show the greatest and most consistent improvement in performance under the failure condition. They should show no improvement or possibly even a decrement in performance under the success condition, and their performance under the neutral condition should be most saliently characterized by its variability.

Non-learners should show some improvement in performance under the success condition with no improvement or actual decrement under the other two conditions.

Hypotheses Concerning Learning. Since normals and non-performers presumably learn to the same degree, there should be no measurable difference in learning between these two groups. The non-learners, however, should be inferior when compared to the two previous groups. Theoretically, the experimental conditions during the performance trials should have no effect on

the degree or amount of learning.

Actually, however, in order to give evidence of what he has learned a child must also perform. Therefore, a child's "learning score" (or, operationally, the number of items he can recall and write down) may be influenced by the complex interaction of a variety of factors -- conditions under which the performance trials took place, the degree of anxiety created during performance, the group to which he belonged (No, NP, NL), etc. An effort will be made to analyze and discuss the data to shed some light on a few of these interactions.

Hypotheses Concerning Anxiety Scale Scores. In general, it might be expected that normals would show less evidence of test anxiety than either the non-performers or the non-learners. They should also be little influenced by the experimental conditions.

Non-performers might be expected to show evidence of most test anxiety under the condition of success, somewhat less under failure, and least of all under neutral.

Non-learners might be expected to show most evidence of test anxiety under the neutral condition because of their presumed difficulty with independent action. Their test anxiety scores may well not differ under the two evaluative conditions.

The General Anxiety Scale scores should not be affected by conditions. It is possible that the normals may have lower GASC scores than the other two groups, but it would not be surprising to find no differences at all among the groups.

Chapter II

PROCEDURE

Subjects

The subjects in this study were 100 boys from the fourth, fifth, and sixth grades of two Durham County, North Carolina schools. Preliminary screening was done by careful examination of the school records of all the boys in these three grades from both schools.

These records routinely contain scores from group intelligence and achievement tests, academic grades, and annual summary comments and behavior descriptions written by the teacher. Where relevant, they may also include notations of particular academic difficulty or discipline problems, parent-teacher conferences, results of special testing, or psychiatric referral or treatment.

In order to keep the groups as homogeneous as possible and to avoid including children where a learning difficulty might be secondary to a more general condition, children were excluded from further consideration in this study for any one of a variety of reasons.

1. Incomplete Records. In a few instances, usually where a child had recently transferred from another school, the record did not contain essential information.
2. I.Q. score below 90. There were usually I.Q. scores from more than one test. If any of these were below 90, the child was excluded from further consideration. Thus, all children in the sample may be considered to have at least average intelligence.

A more detailed analysis of I.Q. scores and other matching variables is given in the appendix.

3. History of referral for psychiatric diagnosis or treatment.
4. Chronic or debilitating physical disability.
5. Gross family or social pathology and disorganization that has come to the attention of the school.
6. Indications or history of brain damage or any other specific deficits that would adversely affect learning.

Children from the fourth, fifth, and sixth grades were chosen for study because it is generally agreed that children at this age level have passed the very early stages of childhood development but are not yet involved in the conflicts attendant upon adolescence. Their personality patterns have developed to a certain degree of relative stability and have not yet been disturbed by the restructuring usually precipitated by the onset of puberty.

Finally, only boys were used in this investigation for two, probably related reasons.

1. On a purely empirical or statistical basis, the kind of learning difficulty under consideration here occurs with strikingly greater frequency in boys. The ratio usually given is of the order of eight to one. (Blanchard, 1946, p. 163)
2. The studies by Crandall and others of achievement motivation and performance in children give evidence of systematic and consistent sex differences. (Crandall, 1963, p. 416)

From the group remaining after the preliminary screening, children were drawn for inclusion in the study by a method that might be characterized as "informally random." That is, efforts were made to use information from the school records to include children from all levels of intelligence, academic grades, and achievement test scores.

Groups

When a sample of 100 Ss had been accumulated, the three groups of normal, non-learner, non-performer were defined by statistical comparison of the congruence or discrepancy between level of performance on an achievement test and level of actual academic performance. Since all children in the study had I.Q. scores of at least 90, "normal" or adequate intelligence was assumed.

Certainly a comparison of achievement test level vs. academic grade level based on a wide range of academic subjects or areas would have been desirable. Such a comprehensive evaluation of academic and achievement test performance is, however, quite complex and technically difficult. For the purposes of this study, a relatively simple comparison of achievement test scores on reading and academic grades in reading seemed adequate. Reading is such a fundamental academic skill that it seemed likely that learning, performance, or achievement difficulties in this area would be basic to and reflected in such difficulties in other academic areas.

Thus, the measure of academic achievement was simply each child's current school mark in reading.

A measure of reading achievement level was obtained from the score on the reading section of the Wide Range Achievement Test administered individually to each child selected to be a subject in the study. This test is easily and quickly administered and scored, and in two studies (Hopkins, Dodson, and Oldridge, 1962), (Oldridge, 1964) has been shown to correlate highly with teacher rankings of reading ability and with a more comprehensive evaluation of reading skills (The California Reading Vocabulary and Comprehension Tests of the 1957 edition of the California Achievement Tests).

Raw scores on this test may be converted directly to a "grade rating" score. This score is the average grade placement (year and month) that would be expected on the basis of the child's performance on the test. To quote from the WRAT Manual, "If S. reads 75 words correctly, his grade rating is 8.2 which means that S. reads as well as the average 8th grader in the beginning of the year." (Jastak, 1946, p. 6) Since subjects were drawn from three grade levels and since the data collection extended over a period of some months, a corrected achievement score was obtained by subtracting each child's actual grade placement from the grade placement based on his achievement test score.

Statistically the three groups were defined by computing the regression of academic marks on the corrected achievement scores and the standard deviation of academic marks around this regression line. In general there was good prediction of academic marks from corrected achievement scores.

The non-performer group was composed of all subjects whose academic mark was more than three-quarters of a standard deviation below the mark predicted by the corrected achievement score. That is, any individual in the non-performer group was a child whose academic performance was considerably lower than it should have been as judged by the empirical relationship between academic marks and corrected achievement scores in all subjects.

The non-learner group was composed of all subjects whose academic mark was within three-quarters of a standard deviation of the academic marks around the regression line and whose academic mark was in the lower 60% of the distribution of grades. That is, any individual in the non-learner group was a child whose academic performance was congruent with his corrected achievement score, and whose performance on both was relatively low. The choice of the 60% cut-off point was made for two reasons based on an

empirical inspection of the distribution of academic marks.

1. This distribution was somewhat bi-modal, so that with a 60% - 40% split the lower part of the distribution was composed mostly of marks of "D" or lower with only a few "C" or "average" marks. The upper part of the distribution contained the marks of "B" or better with only a sprinkling of "C" or "average" marks.
2. Such a split most nearly equalized the number of subjects in each group.

The normal group was composed of all subjects whose academic marks were not significantly lower than predicted from the corrected achievement scores and whose academic mark was in the top 40% of the distribution. Thus an individual in the normal group was a child whose academic performance was congruent with or better than the prediction from the corrected achievement test score.

Procedures and Experimental Conditions

Every subject in the study was seen individually. The examiner introduced himself to each one by explaining that he was a psychologist from the University of North Carolina interested in research about how different children did different things. It was made clear that he would be seeing a number of children in the school and had already seen many children in other schools. Each child was assured that what was to be done would in no way affect his school marks, and that in fact no one in the school would know any of the individual results.

A subject was first asked to tell a story to each of two cards from the Thematic Apperception Test (1 and 8BM) and two from the Michigan Picture Test (M3 and M10B). The usual instructions were used, and the administration was informal. That is, questions, encouragement, comments, etc. were used


to obtain as complete and meaningful a story as possible. This technique was used as an introduction to the experimental session for several reasons. It provided an opportunity for the subject to develop some feeling of comfort and involvement in the situation. At the same time, the examiner had an opportunity to gain some limited understanding of the child. It was hoped that the content of the stories would provide some information about these children's attitudes and phantasies about school, learning, and achievement. These data are not considered in the present paper but will provide material for future study.



In actual order of presentation, the next task for the subject was the "Reading" section of the Wide Range Achievement Test discussed above.

With some neutral transitional remark such as "Now we are going to do something different," or "Here is the next thing we are going to do," the subject was given the form for the experimental task. (A sample form follows this page).

In the top half of the divided boxes of the key the ten letters "A" through "J" appear in alphabetical order. Beneath each letter is a different mark or form. Beneath the key are four lines of divided boxes with a letter in the upper half and a blank below each letter. Each letter occurs once in each line in random order. The task, of course, is to put the correct mark below each letter. This task was explained as clearly and simply as possible to each subject, and he was asked to fill in the blanks of the first row for practice. During this practice any difficulty or misunderstanding could be cleared up, and the subject was assured of practice with each letter-symbol combination.

Immediately, the subject was given a new sheet and told that this time he was to fill in all the blanks in all four lines. It was indicated

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I	1.
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7	T
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that he should not skip around but do them straight along, in order. It was emphasized that the main idea was to see how fast the sheet could be completed. He was shown the stop-watch with which the task would be timed and told to start on the signal of "Ready, go" and work as fast as he could. Consecutively, in this manner each subject was given ten trials. The task was arranged so that the subject could not tell in advance how many trials there would be, and differences in time from trial to trial were difficult or impossible for the child to evaluate subjectively. Questions about number of trials, etc. were answered only in that the subject was told that anything he wanted to know would be explained to him after the task completed.

Each subject performed all ten trials under one of three conditions that may for the sake of brevity be labeled "neutral," "success," or "failure."

In the neutral condition, the examiner expressed no evaluative comments or opinions. Following a trial, a neutral or procedural comment like, "O.K." or "Here's the next one" or "Let's go on" might be made. Typically, the routine was easily established and no comment at all was necessary.

In the success condition, the examiner made comments designed to convince the subject that he was performing faster than all or most of the previous subjects had done. The general aim was to create in the subject the feeling that he was performing successfully in comparison or competition with previous subjects. At the same time, an effort was made to avoid personally evaluative remarks about a given subject. For example, phrases like "You are very good," or "You can do this well" were avoided. More typical phrases were "That's faster than most boys can do on the first trial," or "You sure could beat most boys doing this," or "That's about the fastest anybody has done so far."

In the failure condition, the examiner made comments designed to convince the subject that he was performing more slowly than all or most of the previous subjects had done. The general aim was to create in the subject the feeling that he was failing in this particular task in comparison or competition with previous subjects. Again, an effort was made to avoid personally evaluative remarks about a given subject. Some typical remarks were, "It looks like you're not going to be as fast at this as the other boys," or "Most of the boys have been able to do this faster."

In both the success and failure conditions, some consideration had to be given to the frequency and timing of the evaluative comments. A comment after every trial would tend to become stereotyped, mechanical, or unduly disruptive. On the other hand, they had to be made often enough to keep the desired feeling and attitude of success or failure alive. In this, the examiner simply used his clinical judgment in evaluating each child and each situation and tried to phrase and space comments judiciously. Perhaps it should be mentioned that in planning this study serious consideration was given to the possibility of developing some "standard" set of comments and a schedule for their presentation. It seemed, however, that this would not necessarily guarantee "standard conditions," and the more informal clinical method was settled on.

In all three conditions, following the tenth trial, each subject was given a sheet without a key and asked to fill in as many of the blanks as he could from memory. He was reminded that he had not, of course, been asked to try to learn the number-symbol combinations, but that it might be interesting to see how many he had learned. He was told that this trial would not be timed, that he could skip around and go back and fill in ones he

remembered later, and that the main purpose here was to see how many he had learned. Regardless of how many a subject had actually learned, it was always possible to give some praise and reassurance here; for example, "You may not have done it as fast as some, but look how many you learned without even trying." Even if a subject had learned none or only a few, he could be told, "Well, after all you weren't trying to learn them."

Immediately following this, the subject was asked to respond to the Sarason Test Anxiety Scale and General Anxiety Scale in that order. The examiner read each item aloud, and the subject responded by circling "YES" or "NO" on a specially prepared answer sheet.

The session was closed with some informal conversation aimed at allaying any undue residual anxiety and an offer to answer any questions the child might have.

Chapter III

RESULTS

Measures and Method of Analysis

The results to be presented fall conveniently into three categories: (1) performance measures, (2) learning measure, and (3) anxiety measures. Various relationships between these measures will also be considered.

Performance Measures The data for the performance measures was time in seconds per trial over the ten performance trials. However, the major concern here was not in time per trial as such but in amount of change over trials and variance from trial to trial. A regression line and the variance around this line were computed for each subject over the ten trials. The slope of the regression line was taken as the measure of change over trials. That is, a steep slope would indicate a greater amount of change; a flatter slope less change. Variance of each subject around his regression line was taken as a measure of the degree of variation in time from trial to trial.

Learning Measure The number of letter-symbol combinations correctly recalled after the ten performance trials was taken as the measure of learning or memory.

Anxiety Measures Scores on the TASC and GASC were taken as measures of anxiety. It should be remembered that these scales were administered at the end of the experimental session and the responses to them were subject to influence by the experimental conditions.

The method planned for statistical treatment of the data was an analysis of variance to test over-all differences between groups, conditions, and their interactions. However, inspection of the distributions indicated that homogeneity of variance and normality of distribution clearly could not be assumed. Therefore, the non-parametric chi-square was used, but the general format or analogy of an analysis of variance was followed to some extent. That is, chi-squares between conditions across all groups and chi-squares between groups across all conditions were computed to yield evidence relevant to the hypotheses concerning differences among the groups and differences among the conditions on the learning, TASC, and GASC measures. No predictions were made concerning over-all group or condition differences on the performance measures. However, for the sake of completeness, the over-all group and condition analyses of the performance measures will be summarized.

Chi-squares were also computed for groups under each condition and for conditions under each group to yield evidence relevant to the hypotheses concerning the relationships between the performance measures and the evaluative conditions, and to the hypotheses concerning the differences in TASC scores among the conditions in each group.

The number of subjects in these groups by conditions and conditions by groups chi-squares is relatively small, and their statistical power is therefore seriously limited. It did seem, however, that similar chi-squares for the other measures might be useful in picking up trends specific to particular groups under particular conditions, and that they might give information about departures from the more general patterns found in the larger analyses.

The distributions of the variables were divided at the median and the halves labeled as follows - - slope: steep-flat; variance: small-large; learning: good-poor; TASC: low-high; GASC: low-high. The complete chi-

square tables may be found in the appendix. Only summary tables will be presented in the body of the paper.

Results

Conditions Across All Groups - - Learning and GASC Measures The chi-squares for the three conditions across all groups for the learning and GASC measures may be summarized in tabular form.

Table I

Chi-squares of the Learning and GASC
Measures for the Three Experimental
Conditions Across All Groups

	Learning % good	GASC % low
Neutral	65	46
Success	33	57
Failure	40	48
χ^2	7.75	.81
p	< .05	n.s.

From Table I it can be seen that the general hypothesis that "Theoretically, the experimental conditions during the performance trials should have no effect on the degree or amount of learning." is not borne out. There are differences at the $p < .05$ level such that the neutral condition has the highest percentage of subjects with good scores on the

learning measure (65%). The success and failure conditions have about the same percentage of subjects with good scores on the learning measure -- 33% under success and 40% under failure.

The general notion that GASC scores should show no effects of conditions is borne out.

Groups Across all Conditions - - Learning, TASC, and GASC Measures

The chi-squares for the three groups across all conditions for the learning, TASC, and GASC measures may be summarized:

Table II

Chi-squares of the Learning, TASC,
and GASC Measures for the Three
Groups Across All Conditions

	Learning % good	TASC % low	GASC % low
Normal	63	68	60
Non-performer	29	36	46
Non-learner	44	41	41
χ^2	7.87	8.50	2.89
p	< .05	< .05	n.s.

From Table II it can be seen that again the hypotheses concerning learning are not substantiated. It had been expected that the normal and non-performer groups would not differ, but that the non-learner group might be poorer than either of the other two. Actually the normal group has the highest percentage of subjects with good learning scores (63%) and the

non-performer group has the lowest (29%). The non-learner group falls approximately midway between the other two (44%).

It was expected that the "...normals would show less evidence of test anxiety than either the non-performers or the non-learners." and this is confirmed. The normal group has the largest percentage of subjects with low TASC scores (68%), and the non-performer and non-learner groups are both lower and approximately equal - - 36% for the non-performers and 41% for the non-learners.

As expected, there are no differences among the groups on the GASC scores.

Conditions Across all Groups and Groups Across all Conditions - -
Performance Measures The over-all condition and group chi-square analyses of the performance measures may be summarized:

Table III

Chi-squares of the Performance Measures
 for the three Experimental
 Conditions Across
 All Groups

	Slope % Steep	Variance % Small
Neutral	46	41
Success	60	63
Failure	39	49
χ^2	2.77	3.49
P	n.s.	< .20

Table IV

Chi-squares of the Performance Measures
for the Three Groups
Across All Conditions

	Slope % Steep	Variance % Small
Normal	50	55
Non-performer	43	50
Non-learner	50	44
χ^2	.40	.89
P	n.s.	n.s.

No clear statistically significant differences are apparent in either conditions or groups. In the conditions analyses there may be a tendency for success to produce the best performance. That is, the highest percentage of subjects with steep slope and small variance fall under this condition. The neutral and failure condition percentages are more nearly equal and smaller than those for success. In the group analyses, no differences or patterns are apparent.

Groups Under Each Condition - - Performance Measures The Chi-squares for each group under each condition for the two performance measures may be summarized:

Table V
Chi-squares of the Slope Measure for
Each Group Under Each Condition

	% Steep		
	Neutral	Success	Failure
Normal	53	58	36
Non-performer	38	67	27
Non-learner	43	56	55
χ^2	.60	.25	1.78
p	n.s.	n.s.	n.s.

Table VI
Chi-squares of the Variance Measure for
Each Group Under Each Condition

	% Small		
	Neutral	Success	Failure
Normal	53	67	46
Non-performer	38	67	46
Non-learner	29	56	55
χ^2	1.88	.34	.24
p	n.s.	n.s.	n.s.

It can be most simply said that none of the hypotheses concerning the performance of the different groups under each condition was substantiated.

Under the neutral condition the results are in the expected direction. That is, normals do show better performance (steep slope and small variance) than the other two groups, but the differences are not statistically significant. Further, the non-performer group did not show the expected high variability.

Under the success condition, the results are again not statistically significant, but they are exactly opposite to what had been predicted. Instead of performing poorly under success, the non-performers do as well or better than the normals under this condition on both slope and variance measures.

Under the failure condition the non-learners perform best, and the normals and non-performers do comparatively poorly. It had been predicted that the non-learners would perform more poorly than the other two groups under this condition. The differences, however, are again not statistically significant.

Conditions Under Each Group - - Performance Measures The Chi-squares for each condition under each group may be summarized:

Table VII

Chi-squares of the Slope Measure for Each
Condition Under Each Group

	% Steep		
	Normal	Non-performer	Non-learner
Neutral	53	38	43
Success	58	67	56
Failure	36	27	55
χ^2	3.22	3.27	.49
p	<.20	<.20	n.s.

Table VIII

Chi-squares of the Variance Measure for Each
Condition Under Each Group

	% Small		
	Normal	Non-performer	Non-learner
Neutral	53	38	29
Success	67	67	56
Failure	46	46	55
χ^2	1.08	1.59	2.34
p	n.s.	n.s.	n.s.

Again it might be said that none of the hypotheses concerning the effect of the conditions under each group is borne out, although for the slope measure there are some trends in the normal and non-performer group significant at the $p < .20$ level.

It was predicted that the normal group would show the least improvement in performance under failure. The slight trend is in this general direction, for the normals have the smallest percentage of subjects with steep slope and small variance under this condition.

In the non-performer group, the slight trend is for them to have the highest percentage of subjects with steep slope in the success condition (67%). The percentages in both the neutral condition (38%) and the failure condition (27%) are lower and approximately equal. The same general pattern is also the case with the variance measure. The highest percentage of

subjects with small variance is in the success condition (67%). The percentages in both the neutral condition (38%) and the failure condition (46%) are lower and approximately equal. Thus, there seems to be some trend for the non-performer group to have better performance (steep slope and small variance) under the success condition. This is, again, the exact opposite of what had been predicted.

If there is any trend at all for the non-learner group, it is for them to show their poorest performance under the neutral condition and to perform slightly better under the two evaluative conditions. The lowest percentage of subjects with steep slope is under the neutral condition (43%). The percentages in the success condition (56%) and the failure condition (55%) are both slightly better and virtually equal. The same general trend is also true to a slightly greater degree with the variance measure. The smallest percentage of subjects with small variance is in the neutral condition (29%), and the percentages in both the success condition (56%) and the failure condition (55%) are slightly higher and equal. The prediction had been that the non-learner group would show the greatest improvement in performance in the success condition.

Groups Under Each Condition - - Learning, TASC, and GASC Measures

Since there had been an over-all conditions effect in the learning measure and over-all groups effects in the learning and TASC measures, these two measures and the GASC were examined in each group under each condition. The results of the chi-squares for the learning measure may be summarized:

Table IX

Chi-squares of the Learning Measure for Each
Group Under Each Condition

	Neutral	Success	Failure	χ^2	p
Normal	80	50	55	3.07	n.s.
Non-performer	50	11	27	3.15	n.s.
Non-learner	57	33	36	1.66	n.s.
χ^2	2.65	3.51	1.78		
p	n.s.	<.20	n.s.		

Briefly re-stated, the over-all conditions effect on learning was that the highest percentage of subjects with good learning was in the neutral condition. The percentages in the success and failure conditions were more nearly equal but with a slightly higher percentage under the failure condition. It can be seen that the groups by condition analyses do not challenge the over-all condition effect. One slight variation is that the markedly poor learning for the non-performer group under the success condition causes a wider discrepancy between the success condition and the failure condition for this group than for the other two groups.

The over-all group effect was that the normal group had the highest percentage of subjects with good learning. The non-learner group had the next highest, and the non-performer group had the lowest. However, when conditions under each group are considered, this picture is somewhat altered. Under the neutral and failure conditions, the normal group has the highest

percentage of subjects with good learning and the non-performer and non-learner groups are more nearly equal, with the non-learner group having only a slightly higher percentage. Under the success condition, however, the particularly low percentage of the non-performer group widens the discrepancy between the non-performer group and the non-learner group. Thus the relatively even spacing between the groups over-all is to some extent an artifact of the low score of the non-performer group under the success condition. Since the over-all chi-squares were significant and the groups by condition analyses were not, the pattern just described may be held only as a tentative generalization. The percentages actually seem quite clear, however.

Put more simply, it is the success condition that separates the two experimental groups and produces much poorer learning in the non-performer group.

The results of the groups by conditions chi-squares for the TASC measure may be summarized:

Table X

Chi-squares of the TASC Measure for Each Group
Under Each Condition

	% Low			χ^2	p
	Neutral	Success	Failure		
Normal	80	67	54	1.93	n.s.
Non-performer	62	11	36	4.88	<.10
Non-learner	28	44	54	1.77	n.s.
χ^2	7.93	6.47	.91		
p	<.05	<.05	n.s.		

There was no over-all statistically significant conditions effect on the TASC measure. In these conditions by groups analyses, statistically speaking, the same is true for the normal and non-learner groups. There is a trend, significant at the $p < .10$ level, in the non-performer group. Despite this relative lack of statistical significance, the actual pattern or ordering of the percentages in each group may be worth noting.

In the normal group, the highest percentage of low TASC scores is under the neutral condition. The next highest percentage of low TASC scores is under the success condition, and the lowest percentage of low TASC scores is under the failure condition. That is, the normal group shows evidence of least test anxiety under the neutral condition and most test anxiety under the failure condition, with the success condition falling between the other two.

In the non-learner group, exactly the reverse is true. This group shows evidence of most test anxiety under the neutral condition and least test anxiety under the failure condition, with success falling between the other two.

The non-performer group shows yet another pattern. Most anxiety is evident under the success condition and least under neutral, with the failure condition falling between the other two.

In short, each group shows evidence of the most anxiety under a different condition: the normal group under failure; the non-learner group under neutral; and the non-performer group under success.

There was an over-all group difference on the TASC measure at the $p < .05$ level. The normal group showed evidence of the least test anxiety.

The non-learner and non-performer groups gave evidence of more anxiety, the non-performer being slightly higher.

In the groups by conditions analyses, significant chi-squares ($p < .05$) were obtained under both the neutral and success conditions.

Under the neutral condition, the pattern is approximately the same as for the over-all group differences. The normal group shows evidence of least test anxiety, the non-performer group shows more, and the non-learner group shows evidence of most anxiety.

Under success, however, the pattern is considerably altered. The normal group again shows evidence of least test anxiety, but the non-performer group now very clearly shows evidence of the most anxiety. The non-learner group falls between the other two.

Under the failure condition, there are no statistically significant differences. The non-performer group shows evidence of the most anxiety. The other two groups are equal and show evidence of less test anxiety.

These findings suggest that the pattern found in the over-all group analysis must be taken as tentative since the TASC scores of the groups are differentially related to the experimental conditions.

The results of the groups by conditions chi-squares for the GASC measure may be summarized:

Table XI

Chi-squares for the GASC Measure for Each Group
Under Each Condition

	% Low			χ^2	p
	Neutral	Success	Failure		
Normal	53	67	64	.06	n.s.
Non-performer	50	44	45	.05	n.s.
Non-learner	36	56	36	.10	n.s.
χ^2	.97	.10	.12		
p	n.s.	n.s.	n.s.		

There were no over-all statistically significant group or condition effects on the GASC scores. This is also true in the groups by conditions analyses summarized above. Thus, it seems safe to say that GASC level is not affected by group or condition or differentially by groups and conditions. This is in contrast to the TASC scores where group, condition, and groups by conditions effects were apparent.

Summary

Performance Measures In all the analyses there are no statistically significant differences in slope and variance. It must be noted, however, that the non-performer group under the success condition shows a higher percentage of subjects with steep slope than any other group under any other

condition. This same combination (non-performer group under success condition) also shows a percentage of subjects with small variance equal to or larger than that in any other group under any other condition.

The non-learner group tends to perform particularly poorly (flat slope and larger variance) under the neutral condition. There is almost no difference at all in their performance under success or failure.

The percentages for steep slope and small variance in the normal group tend to parallel those of the non-performer group except that they are not so widely divergent; normals show widest scatter under failure and the non-performers under neutral.

Learning Measure There was an over-all conditions difference in the learning measure significant at the $p < .05$ level. The neutral condition had the highest percentage of subjects with good learning. The two experimental conditions had lower and approximately equal percentages. In the analyses of groups under each condition, the non-performer group under success had a particularly low percentage of subjects with good learning and this widened the discrepancy between the two experimental conditions.

There was also an over-all groups difference in the learning measure significant at the $p < .05$ level. The normal group had the highest percentage of subjects with good learning. The non-learner group had the next highest, and the non-performer group had the lowest. In the analyses of conditions under each group, the non-performer group under success had a particularly low percentage of subjects with good learning scores and this widened the discrepancy between the two experimental groups.

The non-performer group under the success condition had a lower percentage of subjects with good learning than any other group under any other condition.

TASC and GASC There was no over-all statistically significant conditions effect on the TASC measure.. In the conditions under each group, there were no significant differences for the normal and non-learner group. There was a tendency for the non-performer group to have the lowest percentage of subjects with low anxiety under the success condition.

There was an over-all group difference in the TASC measure at the $p < .05$ level. The normal group had the highest percentage of subjects with low anxiety. The non-learner and non-performer groups had lower percentages of subjects with low anxiety. In the groups under each condition, the non-performer group under success had a particularly low percentage of subjects with low TASC. Again, in fact, the non-performer group under the success condition had a lower percentage of subjects with low anxiety scores than any other group under any other condition.

It should be noted that the normal group had its lowest percentage of low TASC scores under the failure condition and the non-learner group had the lowest percentage of subjects with low TASC scores under the neutral condition.

For the GASC measure there were no significant over-all conditions, groups, conditions under each group, or groups under each condition effects.

The fact that the TASC does vary by groups or conditions, while the GASC does not, strongly suggests that the TASC variations are due to the influence of the three experimental conditions on the three experimental groups.

Chapter IV

DISCUSSION

The statistical results provide, in effect, no support for the specific hypotheses as stated. Despite this, patterns of the results suggest that some of the underlying assumptions and some more general hypotheses may be tenable.

It does seem that the groups that were defined statistically are to some extent distinct groups, and this lends credence to the notion that they represent two types of learning problems. There were statistically significant group differences in the over-all analysis of the learning and TASC measures, and some of the non-significant patterns to be discussed below suggest a certain cohesiveness of group response.

Further, it seems that the experimental conditions were effectively created in that there were over-all conditions differences significant at the $p < .05$ level on the learning measure.

It also seems that the groups are in some way differentially responsive to the experimental conditions. It had been hypothesized that the non-performer group would show a tendency to "need to fail" or to "renounce success" under conditions of competitive success. This general statement is clearly not tenable, but there is compelling evidence that this group does respond with a particular selectivity or intensity to this condition. That is, the non-performer group under the condition of competitive success had:

- a.) a higher percentage of subjects with steep slope than any other group under any other condition;
- b.) a percentage of subjects with small variance equal to or larger than any other group under any other condition;
- c.) a lower percentage of subjects with good learning than any other group under any other condition; and
- d.) a lower percentage of subjects with low anxiety scores than any other group under any other condition.

Within the non-performer group, the high percentage of subjects with steep slope and small variance, and the low percentage of subjects with good learning and low TASC scores under the success condition can be seen in the following table.

Table XII

Percentage of Subjects in the Indicated Half
of the Distribution for all Measures
for the Non-performer Group

	Slope	Variance	Learning	TASC	GASC
	% Steep	% Small	% Good	% Low	% Low
Neutral	38	38	50	62	50
Success	67	67	11	11	44
Failure	27	46	27	36	45

With the exception of the GASC scores, the percentages under success seem clearly differentiated from those under both failure and neutral. The percentages under failure and neutral also show some separation. Thus, despite the lack of statistical significance, perhaps it may be said that the non-performer group responds differentially to each of the three experimental conditions but is particularly reactive to the condition of competitive success.

In somewhat the same compelling way, the non-learner group does not seem to distinguish between the success and failure conditions. The same table of percentages for the non-learner group illustrates this clearly.

Table XIII

Percentage of Subjects in the Indicated Half
of the Distribution for all Measures
for the Non-learner Group

	Slope	Variance	Learning	TASC	GASC
	% Steep	% Small	% Good	% Low	% Low
Neutral	43	29	57	28	36
Success	56	56	33	44	56
Failure	55	55	36	54	36

Thus, it can be seen that with the exception of the GASC measure, the percentages under success and failure are almost identical, and that they differ considerably from the percentages under neutral. This group has good performance, low test anxiety, but poor learning under conditions of both success and failure.

A comparable table for the normal group suggests that it, like the non-performer group, distinguishes between all three experimental conditions but is not so overwhelmingly responsive to the success condition as the non-performer group.

Table XIV

Percentage of Subjects in the Indicated Half
of the Distribution for all Measures
for the Normal Group

	Slope	Variance	Learning	TASC	GASC
	% Steep	% Small	% Good	% Low	% Low
Neutral	53	53	80	80	53
Success	58	67	50	67	67
Failure	36	46	55	54	64

For slope, the percentages under neutral and success are approximately equal, and higher than the percentage under failure. For variance, the highest percentage is under success, and the percentages under neutral and failure are lower and more nearly equal. For learning, the highest percentage is under neutral, and the percentages under success and failure are lower and more nearly equal. For TASC, the percentages of low anxiety scores are evenly spaced. The highest percentage is under neutral; the next highest is under success, and the lowest is under failure. For GASC, the percentages under success and failure are about the same and higher than the percentage under neutral.

The pattern for each group may be summarized:

The normal group responds differentially to all three conditions but is not overly responsive to any one. It maintains good performance except under failure and shows evidence of most learning under neutral. It shows evidence of most test anxiety under failure and least under neutral.

The non-performer group also responds differentially to all three conditions but seems most responsive to success. It performs well only under success and also shows evidence of least learning and most anxiety under this condition.

The non-learner group does not seem to respond differentially to success and failure on either the performance or learning measures. It performs equally well under success or failure and shows equally poor learning under both. On the TASC measure, the three groups are more sharply, differentiated. There is most anxiety under neutral and least under failure.

On the performance measures there are no statistically significant differences among the groups under any condition. It might, therefore, be assumed either that the groups are not discrete or that this measure does not differentiate among them. However, the statistically significant group differences on the learning and TASC measures strongly suggest that discrete groups have been defined, and the pattern of results suggests that differential interactions between the groups and conditions may have significantly altered performance levels. That is, under the success condition the non-performer group actually performs as well or better than the normal group; and under failure the non-learners perform better than the other two groups. Thus, under certain conditions, the level of performance of the two experimental groups improves to the point that it is equal to or better than that of the normal group. This seems to suggest that the lack of statistically significant differences on the performance measures may be due to alterations in motivational variables among the groups rather than to the fact that the groups are not discrete or that the measure inherently lacks the sensitivity to discriminate among them.

At this point some consideration must be given to the task and measure that up to now has been labeled simply "learning".

Inevitably, the task involves both learning and performance variables. To the extent that the subject had to reproduce something from his memory, it must be considered learning. To the extent that he had to perform, it must be considered performance. Perhaps it might most simply be called the performance of something that has been learned.

In addition to these ever-present theoretical difficulties, the learning in this experiment was "incidental". That is, the subjects were asked to perform in a certain way, and the learning on which they were later tested took place during the performance trials. Thus, variations in learning scores might be the result of factors that actually interfered with learning during the performance trials, or they might be due solely to factors at the time the subject was asked to produce what he had learned.

It does seem likely that there were factors operating in the three experimental conditions during the performance trials that influenced the actual amount of learning. There was an over-all conditions effect on the learning measure such that the neutral condition had the highest percentage of subjects with good scores. The success and failure conditions were both lower and about equal. This over-all finding was essentially not altered by the groups by conditions analyses except for the fact that the non-performer group showed evidence of particularly poor learning under the success condition.

Thus it seems that the conditions of competitive success or failure feedback were generally detrimental to learning; and the competitive success feedback was particularly detrimental to the non-performer group.

There are, however, certain aspects of the learning test or trial itself which may have differentially influenced each group's reproduction of what it had actually learned.

First, is the simple fact that the learning trial followed immediately after the performance trials. Internal motivational or attitudinal states that interfered with or facilitated a subject's ability to reproduce what he had learned may have developed during the performance trials.

Second, it was much easier for a subject to evaluate the adequacy of his own production on the learning trial than it was on the performance trial. There were a number of clearly visible, empty boxes to be filled in. Thus, for example, if they were all left blank, a subject could be sure he had done very poorly. On the performance trials, by contrast, a subject's evaluation of his own adequacy had to be based on a subjective estimate of variations in time per trial; a variation that was often only a matter of a few seconds.

Further, the learning trial involved the reproduction of something from inside the subject. In the performance trials a subject simply had to perform a relatively simple visual-motor task as rapidly as possible. In the reproduction of what he had learned, he had to reveal something that was perhaps more personally meaningful about the internal structure of what he had learned.

It seemed necessary to mention these possible sources of variation in the reproduction of what had been learned. There is, however, no real reason to believe that they would have produced the particular pattern of variations in the learning scores that is evident in both the over-all conditions and the groups by conditions analyses.

Rather, the more likely hypothesis is that the conditions of

competitive success and failure during the performance trials impaired the learning of all three groups, and that competitive success was particularly detrimental to learning in the non-performer group.

The nature of the learning interference is not clear from these data. Perhaps the most likely hypothesis is that the more the competitive feedback occupies the attention of the subject the less he is free or able to learn. That is, competitive feedback may focus a subject's attention specifically on the task at hand, and to the degree that this occurs, learning in the same situation is interfered with. Thus, both competitive success and competitive failure during the performance trials interfered with learning to some extent in all three groups. Success most dramatically interfered with learning in the non-performer group.

It seems clear, therefore, that the non-performers may fail and "need to fail" in some circumstances. On some tasks, under certain conditions, however, their competitive need to succeed is considerable. In fact, the very intensity of this need may narrow their field of attention to a degree that interferes with effective over-all functioning. It seems likely, also, that the intensity of concern over competitive success and failure may be one of the sources of specific or test anxiety in the groups. Certainly the low percentage of low TASC scores in the non-performer group under the success condition is striking.

There were over-all group differences and groups by conditions differences in the TASC scores that suggested that these scores for each group were differentially related to the experimental conditions. There were no such differences for the GASC scores. A possible explanation for this may be found in the nature of the items in each scale. The TASC scale has many

items that concern immediate physiological or subjective responses to anxiety and subjective concern about competitive comparisons. "When the teacher says that she is going to find out how much you have learned, does your heart begin to beat faster?" "When the teacher says that she is going to give the class a test, do you get a nervous or funny feeling?" "When the teacher is teaching you about reading, do you feel that other children in the class understand her better than you?" The GASC on the other hand contains more items concerned with phobias or general areas of worry and concern: "Are you afraid of mice or rats?" "Are you frightened by lightning or thunderstorms?" "Do you worry that you are going to get sick?" It seems possible that the experimental conditions did differentially arouse some of the specific physiological and subjective concomitants of anxiety within the experimental situation, and that this experience influenced the response to such items on the TASC. Thus, for example, the over-all lower percentages of low TASC scores for the two learning problem groups may have been the result of simply being in the experimental situation at all.

Neither the experimental situation itself nor the specific experimental conditions would be directly relevant to the kind of items on the GASC. Hence, relying entirely on more remote memory, there were no significant differences in GASC.

Conclusions

Very little work has been done to investigate experimentally the learning and performance processes in children with learning problems. This study, despite its shortcomings and pitfalls, does suggest that such an

approach is feasible. Meaningful groups can be defined within the normal school population, and different experimental or motivational conditions can be created with relative ease.

The theoretical distinction between learning and performance does seem important in any investigation of children with learning problems. The relationship between the two processes seems to be more complex than some writers have implied, and the role of each in academic achievement is far from clear. In fact, the experimental investigation of some of these relationships and their relevant variables needs much further research effort.

The two types of learning problems distinguished in this study do seem sufficiently discrete that each might warrant further study.

The crucial role of competitive success in influencing the behavior of the non-performer group does seem to have been demonstrated. The details of how it exerts this influence are still obscure. Certainly, the "need to fail" or "renunciation of success" stressed by the group of studies from the Judge Baker Foundation is not in itself sufficiently explanatory. The present study suggests, in fact, that in certain kinds of tasks under certain conditions one must also consider the non-performer's intense need to succeed. Further investigation of the internal psychological dynamics of individual children with this type of learning problem could help elucidate the relative importance of these two classes of motivational variables. More individual case studies would be useful, and the fantasy material from the Thematic Apperception Test stories that were gathered in connection with this study may also be used for this purpose.

Further, and perhaps more importantly, it is clear that in addition to either or both of these "broad motivational patterns" many other details

and variables must be specified if the behavior of these children is to be understood or predicted. This study, for example, indicates the importance of the nature of the experimental situation; the nature of the task itself; and the nature of specific motivational conditions.

Similarly, many intriguing problems remain to be investigated in the non-learner group: for example, the fact that they do not seem to respond differentially to competitive success and failure but show some improvement in performance under both conditions; or that unlike the other two groups they show evidence of most test anxiety under the neutral condition. Perhaps they lack the internal motivation to sustain a high level of performance on their own. Simply knowing how they are performing (or knowing that another person has continuing interest in their performance) is more important to them than how well or poorly they are performing. Without some external evaluation they tend to become anxious, but this anxiety does not seem to interfere with their learning in the way that it does in the non-performer group.

This study has suggested that academic "learning problems" may involve disturbance in learning or performance or both and that this disturbance is related to the type of learning problem (non-performer or non-learner), the nature of the evaluative conditions (competitive success, competitive failure, or neutral), and the complex interactions among these variables and processes.

APPENDIXES

Appendix A

STATISTICAL ANALYSES OF CONTROL VARIABLES

In order to investigate the possible influence of the control variables, analyses of variance were performed for mean grade in school, mean academic grade, and mean I.Q. of the three groups in the study. These analyses tested for differences between means of groups, of conditions, and for group by condition interactions. Tables XV, XVI, and XVII show the means and the results of the analyses.

Table XV
Analysis of Variance of Grade in School
by Conditions and Groups

<u>MEANS</u>				
	Neutral	Failure	Success	Total
Normal	5.5	5.8	5.2	5.5
Non-performer	5.2	5.3	5.6	5.4
Non-learner	5.4	5.5	5.5	5.4
Total	5.4	5.5	5.4	

<u>RESULTS</u>				
Source	df	M.S.	F	p
Group	2	0.02	.31	n.s.
Condition	2	0.02	.42	n.s.
Interaction	4	0.06	1.2	n.s.
Error	91	0.05		

Table XVI
Analysis of Variance of Academic Grades^a
by Conditions and Groups

<u>MEANS</u>				
	Neutral	Failure	Success	Total
Normal	2.7	2.6	2.2	2.5
Non-performer	7.4	7.4	7.1	7.3
Non-learner	8.2	7.4	6.7	7.5
Total	5.8	5.8	5.0	

<u>RESULTS</u>				
Source	df	M.S.	F	p
Group	2	23.63	26.73	< .001
Condition	2	0.44	0.50	n.s.
Interaction	4	0.11	0.12	n.s.
Error	91	0.88		

a. Academic grades, usually expressed in letters, were assigned numerical equivalents: 1=B+ or better, 2=B, 3=B-, 4=C+, 5=C, 6=C-, 7=D+, 8=D, 9=D-, 10=F.

Table XVII
 Analysis of Variance of I.Q.
 by Conditions and Groups

<u>MEANS</u>				
	Neutral	Failure	Success	Total
Normal	105.9	114.6	105.8	108.4
Non-performer	101.1	101.8	99.9	101.0
Non-learner	99.9	100.6	104.2	101.3
Total	102.6	105.7	103.5	

<u>RESULTS</u>				
Source	df	M.S.	F	p
Group	2	56.45	8.43	<.001
Condition	2	9.24	1.38	n.s.
Interaction	4	11.56	1.73	n.s.
Error	91	6.70		

In Table XII it can be seen that the groups were closely matched in regard to grade level in school. None of the three F ratios were significant.

In the analysis of mean academic grades shown in Table XIII the conditions and group by conditions effects were not significant. A highly significant group effect was found, however. Inspection of the table shows that this was contributed by the better academic grades of the normal group. Non-performers were only slightly better than non-learners.

Mean I.Q.'s in Table XIV differed in much the same way. The normal group had higher mean I.Q.'s while the non-performer and non-learner groups were similarly low. Again, nothing was significant but the group term.

It must, therefore, be considered whether the differing I.Q. of the groups contributed to the group differences that were found in the analyses of the dependent variables. This actually seems unlikely, or possibly irrelevant, for two reasons. First, there were no significant group differences on the performance measures. Thus if one assumed that the group differences on the learning and SAS measures were due to differing I.Q. scores, it would also have to be assumed that these same I.Q. differences in no way significantly influenced the performance measures. Second, some of the most interesting patterns of differences occurred in the analyses of conditions under each group where I.Q. differences between groups would be irrelevant.

Nevertheless, analyses were done to investigate the possibility of the influence of differing group I.Q.'s on the major results of the study. The total group was divided into three ranges of I.Q.: 90-99, 100-109, 110⁺. Chi-squares were computed to see if the proportions of steep or flat slope, small or large variance, good or poor learning, and high or low TASC scores differed with I.Q. level. Table XV shows the frequencies used in the analyses and the resulting chi-squares.

Table XVIII

Slope, Variance, Learning, TASC as a Function of I.Q.
 Level - - Number of Subjects in Each Category

I.Q.	<u>SLOPE</u>		χ^2
	Steep	Flat	
90-99	11	14	1.10
100-109	28	25	
110 ⁺	9	13	

I.Q.	<u>VARIANCE</u>		χ^2
	Small	Large	
90-99	13	12	.90
100-109	28	25	
110 ⁺	9	13	

I.Q.	<u>LEARNING</u>		χ^2
	Good	Poor	
90-99	11	14	2.77
100-109	23	30	
110 ⁺	14	8	

I.Q.	<u>TASC</u>		χ^2
	Low	High	
90-99	11	14	.56
100-109	27	26	
110 ⁺	12	10	

None of the chi-squares were significant. Thus, though I.Q. did vary between groups, it does not seem to have any significant influence on the measures of interest in this study. It seems safe to assume that the group I.Q. differences neither contributed to nor masked experimental results.

Appendix B

CONDITIONS, GROUPS, GROUPS UNDER EACH CONDITION, AND CONDITIONS
UNDER EACH GROUP CHI-SQUARE TABLES FOR SLOPE, VARIANCE,
LEARNING, TASC, AND GASC MEASURES

Table XIX

Number of Subjects in Conditions, Groups, Groups
Under Each Condition, and Conditions Under
Each Group; Chi-square Tables for Slope

<u>CONDITIONS</u>			<u>GROUPS</u>		
	Steep	Flat		Steep	Flat
Neutral	17	20	Normal	19	19
Success	18	12	Non-performer	12	16
Failure	13	20	Non-learner	17	17
		$\chi^2 = 2.77$			$\chi^2 = 0.41$
		p n.s.			p n.s.
<u>NEUTRAL</u>			<u>NORMAL</u>		
	Steep	Flat		Steep	Flat
Normal	8	7	Neutral	8	7
Non-performer	3	5	Success	7	5
Non-learner	6	8	Failure	4	7
		$\chi^2 = 0.61$			$\chi^2 = 3.22$
		p n.s.			p < .20
<u>SUCCESS</u>			<u>NON-PERFORMER</u>		
	Steep	Flat		Steep	Flat
Normal	7	5	Neutral	3	5
Non-performer	6	3	Success	6	3
Non-learner	5	4	Failure	3	8
		$\chi^2 = 0.25$			$\chi^2 = 3.27$
		p n.s.			p < .20
<u>FAILURE</u>			<u>NON-LEARNER</u>		
	Steep	Flat		Steep	Flat
Normal	4	7	Neutral	6	8
Non-performer	3	8	Success	5	4
Non-learner	6	5	Failure	6	5
		$\chi^2 = 1.78$			$\chi^2 = 0.49$
		p n.s.			p n.s.

Table XX

Number of Subjects in Conditions, Groups, Groups Under
Each Condition, and Conditions Under Each
Group; Chi-square Tables for Variance

<u>CONDITION</u>			<u>GROUPS</u>		
	Small	Large		Small	Large
Neutral	15	22	Normal	21	17
Success	19	11	Non-performer	14	14
Failure	16	17	Non-learner	15	19
		$\chi^2 = 3.49$			$\chi^2 = 0.89$
		$p < .20$			$p \text{ n.s.}$
<u>NEUTRAL</u>			<u>NORMAL</u>		
	Small	Large		Small	Large
Normal	8	7	Neutral	8	7
Non-performer	3	5	Success	8	4
Non-learner	4	10	Failure	5	6
		$\chi^2 = 1.88$			$\chi^2 = 1.08$
		$p \text{ n.s.}$			$p \text{ n.s.}$
<u>SUCCESS</u>			<u>NON-PERFORMER</u>		
	Small	Large		Small	Large
Normal	8	4	Neutral	3	5
Non-performer	6	3	Success	6	3
Non-learner	5	4	Failure	5	6
		$\chi^2 = 0.34$			$\chi^2 = 1.59$
		$p \text{ n.s.}$			$p \text{ n.s.}$
<u>FAILURE</u>			<u>NON-LEARNER</u>		
	Small	Large		Small	Large
Normal	5	6	Neutral	4	10
Non-performer	5	6	Success	5	4
Non-learner	6	5	Failure	6	5
		$\chi^2 = 0.24$			$\chi^2 = 2.34$
		$p \text{ n.s.}$			$p \text{ n.s.}$

Table XXI

Number of Subjects in Conditions, Groups, Groups Under
Each Condition, and Conditions Under Each
Group; Chi-square Tables for Learning

<u>CONDITIONS</u>		
	Good	Poor
Neutral	24	13
Success	10	20
Failure	13	20
	$\chi^2 = 7.75$	
	$p < .05$	

<u>GROUPS</u>		
	Good	Poor
Normal	24	14
Non-performer	8	20
Non-learner	15	19
	$\chi^2 = 7.87$	
	$p < .05$	

<u>NEUTRAL</u>		
	Good	Poor
Normal	12	3
Non-performer	4	4
Non-learner	8	6
	$\chi^2 = 2.65$	
	$p \text{ n.s.}$	

<u>NORMAL</u>		
	Good	Poor
Neutral	12	3
Success	6	6
Failure	6	5
	$\chi^2 = 3.07$	
	$p \text{ n.s.}$	

<u>SUCCESS</u>		
	Good	Poor
Normal	6	6
Non-performer	1	8
Non-learner	3	6
	$\chi^2 = 3.51$	
	$p < .20$	

<u>NON-PERFORMER</u>		
	Good	Poor
Neutral	4	4
Success	1	8
Failure	3	8
	$\chi^2 = 3.15$	
	$p \text{ n.s.}$	

<u>FAILURE</u>		
	Good	Poor
Normal	6	5
Non-performer	3	8
Non-learner	4	7
	$\chi^2 = 1.78$	
	$p \text{ n.s.}$	

<u>NON-LEARNER</u>		
	Good	Poor
Neutral	8	6
Success	3	6
Failure	4	7
	$\chi^2 = 1.66$	
	$p \text{ n.s.}$	

Table XXII

Number of Subjects in Conditions, Groups, Groups Under
Each Condition, and Conditions Under Each
Group; Chi-square Tables for TASC

<u>CONDITIONS</u>			<u>GROUPS</u>		
	Low	High		Low	High
Neutral	21	16	Normal	26	12
Success	13	17	Non-performer	10	18
Failure	16	17	Non-learner	14	20
		$\chi^2 = 1.24$			$\chi^2 = 8.50$
		p n.s.			p < .02
<u>NEUTRAL</u>			<u>NORMAL</u>		
	Low	High		Low	High
Normal	12	3	Neutral	12	3
Non-performer	5	3	Success	8	4
Non-learner	4	10	Failure	6	5
		$\chi^2 = 7.93$			$\chi^2 = 1.93$
		p < .05			p n.s.
<u>SUCCESS</u>			<u>NON-PERFORMER</u>		
	Low	High		Low	High
Normal	8	4	Neutral	5	3
Non-performer	1	8	Success	1	8
Non-learner	4	5	Failure	4	7
		$\chi^2 = 6.47$			$\chi^2 = 4.88$
		p < .05			p < .10
<u>FAILURE</u>			<u>NON-LEARNER</u>		
	Low	High		Low	High
Normal	6	5	Neutral	4	10
Non-performer	4	7	Success	4	5
Non-learner	6	5	Failure	6	5
		$\chi^2 = 0.97$			$\chi^2 = 1.77$
		p n.s.			p n.s.

Table XXIII

Number of Subjects in Conditions, Groups, Groups Under
Each Condition, and Conditions Under Each
Group; Chi-square Tables for GASC

<u>CONDITIONS</u>			<u>GROUPS</u>		
	Low	High		Low	High
Neutral	17	20	Normal	23	15
Success	17	13	Non-performer	13	15
Failure	16	17	Non-learner	14	20
		$\chi^2 = 0.81$			$\chi^2 = 2.89$
		p n.s.			p n.s.
<u>NEUTRAL</u>			<u>NORMAL</u>		
	Low	High		Low	High
Normal	8	7	Neutral	8	7
Non-performer	4	4	Success	8	4
Non-learner	5	9	Failure	7	4
		$\chi^2 = 0.97$			$\chi^2 = 0.06$
		p n.s.			p n.s.
<u>SUCCESS</u>			<u>NON-PERFORMER</u>		
	Low	High		Low	High
Normal	8	4	Neutral	4	4
Non-performer	4	5	Success	4	5
Non-learner	5	4	Failure	5	6
		$\chi^2 = 0.10$			$\chi^2 = 0.05$
		p n.s.			p n.s.
<u>FAILURE</u>			<u>NON-LEARNER</u>		
	Low	High		Low	High
Normal	7	4	Neutral	5	9
Non-performer	5	6	Success	5	4
Non-learner	4	7	Failure	4	7
		$\chi^2 = 0.12$			$\chi^2 = 0.10$
		p n.s.			p n.s.

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BIOGRAPHICAL NOTE

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